

AMES SPAN  
7N-53-CP

The Development of New Scales  
for the Jenkins Activity Survey Measure of the  
Type A Construct

90648  
30P.

Robert S. Pred, Janet T. Spence, and Robert L. Helmreich  
The University of Texas at Austin

(NASA-CR-180354) THE DEVELOPMENT OF NEW  
SCALES FOR THE JENKINS ACTIVITY SURVEY  
MEASURE OF THE TYPE A CONSTRUCT (Texas  
Univ.) 30 p Avail: NTIS

N87-70587

Unclas  
00/53 0090648

The Development of New Scales for the Jenkins  
Activity Survey Measure of the Type A Construct\*

Robert S. Fred, Janet T. Spence, and Robert L. Helmreich

The University of Texas at Austin

The Type A construct has been studied extensively since it was introduced and developed by Friedman and Rosenman (1959, 1974). Based on the observation of their patients, Friedman and Rosenman (1959, 1974) proposed that individuals who exhibit a certain constellation of attributes and behaviors, to which they gave the label Type A, are more vulnerable to coronary heart disease (CHD). They defined the Type A behavior pattern as "an action-emotion complex that can be observed in any person who is aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time, and if required to do so, against the opposing efforts of other things or other persons" (Friedman & Rosenman, 1974, p. 67). Individuals who do not exhibit the Type A pattern are identified as Type B. The two most frequently used methods of assessing the Type A pattern are the Structured Interview (SI; Rosenman, Friedman, Straus, Wurm, Kositchek, Hahn, & Werthessen, 1964), a clinical technique demanding an experienced interviewer, and the Jenkins Activity Survey (JAS; Jenkins, Zyzanski, & Rosenman, 1971), an objective, self-report measure.

Introduction of the Type A construct has stimulated literally hundreds of studies investigating the association between this behavioral pattern and not only CHD and related physical disorders but also many types of behaviors, including vocational and academic performance. The hard-working, ambitious, successful individual is often popularly described as being a "Type A personality", an equation that has some empirical support (e.g., Glass, 1977; Matthews, Helmreich, Beane, & Lucker, 1980).

Recently, questions have arisen about this body of research. The Type A pattern, as is widely recognized, is multi-faceted and a number of investigators have suggested

---

\* The research was sponsored in part by a Cooperative Agreement (NAG2-137) between NASA and Ames Research Center (Robert L. Helmreich), and by a MacArthur Foundation Grant (Janet T. Spence). The authors wish to thank John A. Wilhelm for his assistance with archival data sets, and Tom R. Chidester for his input throughout this project.

that only one aspect, namely, characteristics reflecting hostility, impatience, and irritability, contribute to CHD and related problems (e.g., Matthews, 1982). The present investigators (Helmreich, Pred, & Spence, submitted for publication; Spence, Helmreich, & Pred, in press) have more specifically suggested that the Type A pattern may consist of several relatively independent factors and that the factors contributing to health may differ from the factor or factors contributing to other criterion variables such as academic and vocational performance.

The JAS has been less successful than the SI in predicting cardiovascular disorders, leading to questions about its usefulness and, by inference, the usefulness of other objective measures of the Type A construct. The Structured Interview technique, it has been implied, elicits information about the individual that is not assessed by objective measures (e.g., Friedman, Hall, & Harris, 1984). These judgements, however, may be premature as useful data have been collected with the instrument. At the same time, relatively few attempts have been made to analyze the psychometric properties of the JAS and to revise the instrument based on the results of these analyses. Before dismissing the JAS and data collected with it, it would seem worthwhile to attempt to improve it. An objective, self-report measure has obvious practical advantages over a time-consuming interview technique that requires a skilled, experienced interviewer to yield satisfactory results.

The purpose of the present paper is to describe the results of several factor analyses of the JAS which led to the identification of two relatively independent factors. Also described are two new scales based on these factors and their psychometric properties. Data collected with these scales will also be briefly summarized. As we have described elsewhere (Helmreich, Pred, & Spence, submitted for publication; Spence, Helmreich, & Pred, in press), the two scales have turned out to have different relationships with measures of academic and vocational performances and measures of health-related symptoms. Before presenting these findings, we will review some of the background literature in more detail.

### The Structured Interview Method

The Structured Interview (SI) technique was based primarily upon observations of male middle-class patients with CHD in the Western Collaborative Group Study (WCGS; Rosenman, Friedman, Straus, Wurm, Kositchek, Hahn, & Werthessen, 1964). The technique consists of a series of provocative, challenging questions such as whether or not the person is upset easily, and is competitive, impatient, and responsible (Rosenman, 1978). The interviewer is trained to scrutinize various behaviors, including the subject's posture, stride, handshake, rate of speech, facial

expressions, and responses to interruptions by the interviewer. Based on these observations, the rater places the respondent into one of four categories, A1, A2, X, and B. The A1 classification reflects the highest manifestation of the Type A pattern, whereas the B classification reflects the relative absence or the opposite of Type A behaviors. Type X is reserved for individuals who exhibit a mixture of Type A and B behaviors.

### The Jenkins Activity Survey

Adult forms. The Jenkins Activity Survey (JAS; Jenkins, Zyzanski, & Rosenman, 1971), a self-administered, objective questionnaire, was developed as a convenient alternative to the SI as a measure of the coronary prone behavior pattern. Each item included on the JAS was originally demonstrated to discriminate between men previously classified as Type A or Type B on the basis of their SI responses from the follow-up examination of the WCGS (Jenkins et al., 1971). Thus, the JAS was initially validated using classifications made by the SI as the criterion, rather than directly using objective, health-related data. The JAS was shown to duplicate the SI classifications in about 73% of the sample (Jenkins et al., 1971; Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975). Somewhat lower concordance rates for males have been reported by other investigators (e.g., Matthews, Krantz, Dembroski, & MacDougall, 1982) and still lower rates have been found for women (e.g., Anderson & Waldron, 1983).

There are several versions of the adult JAS, the most commonly used being the Jenkins Activity Survey for Health Prediction, Form B (Jenkins, Rosenman, & Zyzanski, 1972). Form B differs from the earlier JAS versions in that all items containing gender references are reworded as to be equally appropriate for both sexes. The JAS Form B is comprised of 54 items, some of which have 2 response alternatives, while others have 3, 4, or 5 response alternatives.

Four JAS scales have been developed, an overall Type A-B scale and three subscales: Hard Driving-Competitiveness (H), Speed and Impatience (S), and Job involvement (J) (Jenkins et al., 1971). The 21 item A-B scale is scored using optimal discriminant function weights derived in order to maximize agreement with the SI classification. The H, S, and J scales were factor analytically derived, and each is scored using similar optimal discriminant function weights.

Several of the same items appear on these various JAS scales. Jenkins et al. (1971) report that the scoring weight assigned to an item varies as a function of the scale to which it is assigned. That is, an item appearing on one scale may be scored differently when it appears on another subscale.

Student Version. A student version of the JAS was constructed by Krantz, Glass, and Snyder (JAS Form-T; 1974). Items comprising the job involvement scale on the JAS-Form B (Jenkins et al., 1972) were either eliminated or modified because they were inappropriate for student populations. Items retained from other scales that made reference to employment were reworded so that the references were to college or studying. A simplified scoring system was developed in which responses to each item are scored 1 (Type A) or 0 (Type B).

Glass (1977) conducted a factor analysis of the JAS data from a sample of male college students. A pair of factors emerged that resembled but were not identical to Factors H and S found using the JAS-Form B data from adult males in the WCGS study (Zyzanski & Jenkins, 1970). Whether or not female students' responses would reveal a similar factor structure was left unanswered.

### The Type A Pattern and Health

The Type A pattern, as assessed by the SI, has been established as an independent risk factor for CHD and related disorders such as atherosclerosis (e.g., Rosenman et al., 1964; Jenkins, Rosenman, & Zyzanski, 1974; Kenigsberg, Zyzanski, Jenkins, Wardwell, & Licciardello, 1974; Shekelle, Schoenberger, & Stamler, 1976; Glass, 1977). However, a number of investigators have recently suggested that the critical components in the Type A pattern that are responsible for its association with CHD and other disorders are hostility, anger, and other similar affective reactions. Evidence in support of this hypothesis comes both from studies showing a relationship between CHD and measures of chronic anger and hostility (e.g., Barefoot, Dahlstrom, & Williams, 1983; Haynes, Feinleib, & Kannel, 1980; Medalie & Goldbourt, 1976; Williams, Haney, Lee, Kong, Blumenthal, & Whalen, 1980) and studies of the SI. In a reanalysis of the SI data from the WCGS, Matthews, Glass, Rosenman, and Bortner (1977) found that behaviors indicative of anger and hostility were most predictive of CHD.

The JAS has also been found to be related to measures of health (e.g., Brand, Rosenman, Jenkins, Sholtz, & Zyzanski, 1975; Jenkins, Zyzanski, & Rosenman, & Cleveland, 1971; Jenkins, Zyzanski, & Rosenman, 1976; Zyzanski, Jenkins, Ryan, Flessas, & Everist, 1976). In general, however, the Structured Interview method of assessing the Type A pattern has been shown to be a better predictor of CHD than the JAS (Brand, Rosenman, Jenkins, Sholtz, & Zyzanski, 1978; Matthews & Haynes, 1986). It is particularly important to note in this connection that relatively few items concerning anger and hostility are to be found on the JAS; if these characteristics are the primary contributors to CHD and related disorders, the lower validity of the JAS may be due to this content variable (Matthews, 1982).

## The JAS and Performance

Several components of the Type A pattern correspond to the profile associated with the hard-working, ambitious, and successful individual. Thus it seems possible that in many situations Type A's could be expected to perform better than Type B's. In an extensive review of the literature, Matthews (1982) reports that in laboratory studies, Type A's have been shown to set higher initial goals for performance and to outperform Type B's in demanding situations calling for persistence and endurance and on tasks requiring speed. However, some studies reviewed by Matthews indicate that Type B's outperformed A's on tasks requiring slow, careful responses.

Several studies of real-life achievement behaviors have also reported significant relationships with the Type A pattern. Type A college students, as measured by the student JAS, have been found to earn more academic honors (Glass, 1977) and higher grades (Waldron, Hickey, McPherson, Butensky, Gruss, Overall, Schmader, & Wohlmut, 1980) than Type B's. In a study by Matthews, Helmreich, Beane, and Lucker (1980) of particular importance to the present report, a sample of male social-personality psychologists with academic appointments originally drawn from the larger group studied by Helmreich, Spence, Beane, Lucker, and Matthews (1980) were given the JAS. The respondents' scores on the several JAS scales were significantly correlated with two measures of scholarly attainment, number of scholarly publications and, as a measure of quality of scientific contribution, citations by others to their published work. Taylor, Locke, Lee, and Gist (1984) have similarly reported that Type A faculty members are more productive than Type B's. If they are taken at face value the unsettling conclusion suggested by these findings is that the hard-driving, achievement-oriented qualities of Type A individuals are likely to make them more successful than Type B's but that these individuals simultaneously risk paying a heavy price for their attainments in terms of CHD or other health problems.

## Background of the Present Study

On a descriptive level, the Type A concept is a multifaceted one and it seemed possible that the various aspects of the behavioral pattern identified as Type A are relatively independent. That is, in statistical terms, the several dimensions may not contribute to a single factor. The limited factor analytic data available for the SI and the JAS are not inconsistent with this suggestion.

It also seemed reasonable to assume that different components of the Type A complex would have different correlates and consequences. For example, as has already been discussed, many investigators are coming to believe that

the aspect of the Type A pattern that is associated with CHD and other health problems involves anger, hostility, and related affective reactions. Similarly, the positive relationships that have been found between the Type A pattern and academic and vocational attainment may be attributable primarily to qualities and motives that are quite directly related to achievement-oriented behaviors. It was the interest of the present investigators (e.g., Helmreich et al., 1980; Matthews et al., 1980; Spence & Helmreich, 1983) in achievement-related motives and their effects on real-life performance that initially stimulated us to investigate these possibilities.

Factor analyses of responses to the student JAS obtained from both male and female college students were therefore undertaken, with the ultimate goal of developing a more satisfactory instrument. The primary purpose of the present report is to describe in some detail the results of these analyses and the development of two new scales, Achievement Strivings (AS) and Impatience/Irritability (I/I), based on these results. Also described are the results of a study in which parallel AS and I/I items on the original JAS were identified and the responses of the Matthews et al. (1980) psychologist sample to these items were subjected to a confirmatory factor analysis.

## STUDY 1

### Subjects and Procedure

The subjects were 483 male and 552 female students enrolled in introductory psychology courses at The University of Texas at Austin during the 1985-1986 academic year. The students, most of whom were freshmen, participated as part of a course requirement. Subjects were tested in university classrooms in mixed sex groups ranging in size between 80 and 100 persons on a test battery that included the JAS-Form T.

### Jenkins Activity Survey-Form T

The JAS-Form T (Krantz et al., 1974) consists of 44 items accompanied by rating scales varying from 2 to 5 points. A unit-weighted system of scoring was adopted in which individual items were proportionately adjusted to take account of the fact that the rating scales contained a variable number of points. Extreme responses in the Type A direction were always assigned a score of 5. For a two-point response scale, the Type A response was scored 5, and the nonType A response was scored 2.5. For a three-point scale, the respective scores were 5, 3.33, and 1.67, whereas for a four point scale, they were 5, 3.75, 2.5, and 1.25. For a five-point scale, scores ranged from 5 to 1.

Scores were initially obtained for each subject on the student versions of the items on the three scales developed

by Jenkins, Zyzanski, and Rosenman (1971), namely, overall A-B, Factor H, and Factor S, using the proportion-weighted scoring method described above. These scales were comprised of 21, 17, and 21 items, respectively. The items (in abridged form) and their original scale assignments are shown in Table 1.

## Results

### Exploratory Factor Analyses

Tests of significance. Several tests were first applied to assess the appropriateness of the data for factor analysis (Dziuban & Shirkey, 1974). The results of Bartlett's test of sphericity indicated a rejection of the hypothesis of independence between variables ( $p < .001$ ) for the data from both males and females. The second test involved an inspection of the number of non-zero off-diagonal elements of the anti-image covariance matrix. In the present study, 9.94% of the off-diagonal elements were non-zero for males, while 6.87% were non-zero for females. Both of these values fall within a range indicating that the data were quite suitable for the analyses to be conducted. The Kaiser-Meyer measure of sampling adequacy indices were also satisfactory at .69 and .74 for males and females, respectively. The results of these tests clearly indicated the suitability of the data for factor analysis, and ultimately provide evidence for the psychometric adequacy of the solutions presented in this study.

Factor Analyses. The responses were subjected to separate factor analyses with oblique rotations for males and for females. An oblique rotation was selected rather than an orthogonal varimax rotation given that the factors are not conceptually orthogonal, and given the high correlations between the factor analytic derived scales for Factor H and Factor S in both adult and student populations. Two different types of factor analyses were conducted as a means of replicating factor patterns and factor matrices. This strategy involves the replication of patterns of loadings across rotation methods to verify that the interpretation of the factors is reliable (Rummel, 1970).

Exploratory factor analyses were first conducted using a principal axis solution with iteration and oblique rotation using an oblimin solution (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Second, exploratory factor analyses were conducted using a Joreskog canonical factor analysis with

---

1. For example, the correlation between the H and S scales in the Matthews et al., (1980) sample of male psychologists we found to be .67; in a sample of 202 undergraduate male college students, Matthews, Krantz, Dembroski, & McDougall, (1982) found a correlation of .59 between these two scales.

Table 1

Rotated Factor Pattern Matrices from Two Exploratory Factor Analyses with Oblique Rotations of Unrevised JAS-Form T  
Items for Male (n=483) and Female (n=552) College Students in Study 1

Items with loadings above .35 for both Factorings Methods:

Item No.	Abridged Item Description	Scale Assignment JAS Scale New Scale	Principal Axis				Jöreskog			
			Males		Females		Males		Females	
			I	II	I	II	I	II	I	II
2.	College stir me into action	H,S AS	.43	-.05	.36	-.15	.42	-.08	.36	-.14
9.	I hurry people to come to the point.	AB,S I/I	-.03	.41	.06	.42	-.01	.37	.05	.40
14.	I refuse to wait in lines.	S I/I	-.12	.51	.01	.45	-.10	.48	.00	.44
16.	Others rate me as hard-driving.	AB,H	.48	.45	.61	.33	.51	.48	.64	.37
17.	I consider myself hard-driving.	AB,H,S AS	.49	.41	.59	.26	.53	.42	.63	.29
18.	Friends consider me hard-driving.	AB,H,S	.49	.43	.64	.27	.53	.46	.68	.32
19.	Friends rate me as too active.	AB,H AS	.40	.16	.44	.04	.40	.14	.44	.04
20.	I take my work too seriously.	H AS	.46	.15	.54	.22	.47	.14	.54	.20
22.	I tend to get irritated easily.	H,S I/I	-.14	.62	.03	.66	-.11	.63	.02	.66
23.	I do most things in a hurry.	S I/I	.10	.52	.10	.44	.12	.48	.10	.43
27.	My temper is hard to control.	S I/I	-.04	.56	.01	.54	-.02	.58	-.01	.57
31.	I often set deadlines for myself.	AB,S AS	.42	-.03	.47	-.13	.40	-.06	.44	-.12
40.	I put forth more effort than most.	H AS	.66	-.06	.65	-.13	.64	-.08	.62	-.13
41.	I am more responsible than most.	AB,H	.60	-.16	.51	-.11	.59	-.18	.49	-.11
43.	I am much more precise than most.	H	.46	-.02	.51	-.06	.46	-.04	.49	-.06
44.	I approach life seriously.	AB,H AS	.50	.06	.56	.09	.50	.06	.56	.08

Table 1 (continued)

Items with loadings below .35 for at least one Factoring Method:

Item No.	Abridged Item Description	Scale Assignment	JAS Scale		New Scale		Principal Axis				Jöreskog			
			JAS Scale		New Scale		Males		Females		Males		Females	
			I	II	I	II	I	II	I	II	I	II	I	II
1.	I cannot find time to get my hair cut.	S		.01	.16	.01	.07				.01	.13	.01	.06
3.	My days are filled by problems.	AB,H		.11	.01	.17	.03				.11	.00	.14	.02
4.	I am often faced with annoyances.			-.09	.21	-.02	.31				-.09	.19	-.04	.29
5.	Under pressure I act immediately.	AB		-.26	.17	-.05	.25				-.25	.18	-.06	.26
6.	I eat very rapidly.	AB,S		.03	.25	-.10	.20				.05	.22	-.09	.19
7.	My friends tell me I eat too fast.	AB,S		.11	.31	-.10	.18				.13	.28	-.10	.16
8.	I do two things at once if practical.	S		.07	.20	.04	.14				.07	.17	.03	.13
10.	I put words in others' mouths.	AB,S		-.04	.29	.00	.34				-.02	.26	-.01	.33
11.	I am never late when meeting people.	AB		.06	.03	.10	.04				.06	.01	.10	.03
12.	I hurry even with plenty of time.	S		.03	.26	.13	.24				.04	.22	.12	.23
13.	I get other things done while waiting.	S		.10	.06	.21	.08				.09	.04	.20	.06
15.	I never let children beat me at games.	H		-.02	-.02	-.02	-.06				-.01	-.01	-.01	-.04
21.	I do not have less energy than most.	AB		.37	-.05	.20	-.17				.37	-.05	.19	-.15
24.	I enjoy a contest and try hard to win.	H		.24	.25	.38	.15				.27	.27	.40	.19
25.	I get a lot of fun out of my life.			-.03	.02	-.03	.23				-.02	.02	-.01	.22
26.	My temper was fiery when younger.	AB,S		-.06	.28	-.03	.23				-.02	.02	-.01	.22
28.	When interrupted I feel irritated.	H		-.01	.15	.08	.28				-.01	.16	.07	.27
29.	I have daily deadlines in my courses.	AB		.22	.04	.12	.04				.22	.02	.11	.03

Table 1 (continued)

Items with loadings below .35 for at least one Factoring Method:

Item No.	Abridged Item Description	Scale Assignment	JAS Scale		New Scale		Principal Axis				Jöreskog			
			JAS Scale		New Scale		Males		Females		Males		Females	
			I	II	I	II	I	II	I	II	I	II	I	II
30.	My deadlines carry much pressure.	H	.11	.16	.05	.17	.11	.15	.04	.16	.11	.15	.04	.16
32.	My work improves against deadlines.	H	-.13	.10	-.18	.06	-.13	.12	-.16	.06	-.13	.12	-.16	.06
33.	I often shift between two projects.	AB,S	.22	.10	.26	-.02	.22	.08	.24	-.03	.22	.08	.24	-.03
34.	I study during scheduled vacations.	AB,S	.25	-.01	.39	-.05	.24	-.01	.38	-.04	.24	-.01	.38	-.04
35.	I often bring my work home at night.	AB	.30	.00	.23	-.08	.29	-.01	.21	-.08	.29	-.01	.21	-.08
36.	I often go to school when it is closed.		.22	-.10	.10	-.10	.21	-.09	.09	-.09	.21	-.09	.09	-.09
37.	I push myself to study when tired.	S	.13	.14	.20	.03	.14	.11	.19	.01	.14	.11	.19	.01
38.	Others look to me for leadership.	AB	.22	.14	.33	.01	.23	.14	.31	.02	.23	.14	.31	.02
39.	I often keep lists of things to be done.		.33	-.02	.16	.04	.32	-.03	.14	.03	.32	-.03	.14	.03
42.	I hurry more than other students.	S	.22	.35	.28	.29	.24	.32	.28	.26	.24	.32	.28	.26

oblique rotation using a maximum likelihood solution (Burns, 1977). Based upon an eigenvalue-one criterion, a two-factor solution was subjected to oblique rotation for each of the factoring methods described above.

The rotated factor pattern loadings obtained for each of the 44 items are listed in Table 1. The listing includes loadings from both factoring methods for males and females separately. (Item numbers refer to those on the JAS-Form I scale.) Items that loaded above .35 for both sexes on both factoring methods are shown first, followed by those which failed to meet this criterion. For males, across both factoring methods, 8 items loaded cleanly on the first factor, 5 items loaded cleanly on the second, 3 loaded on both factors, and 28 items failed to meet the criterion for either factor. The parallel numbers for females were 10, 5, 1, and 28, respectively. There was a fairly high degree of concordance between the pattern loadings for the two sexes across factoring methods.

Items that loaded on the first factor all reflect achievement-related strivings (e.g., hard-driving, sets deadlines, puts forth much effort, takes work seriously). This factor, which we designate as Achievement Strivings (AS), accounted for 68% of the variance with eigenvalues of 4.6 for both males and females. The second factor, designated Impatience/Irritability (I/I), loaded with items reflecting impatience, irritability, and anger, and accounted for 32% of the variance for both males and females with eigenvalues equal to 2.1 and 2.2, respectively. The rotated factor pattern loadings were quite consistent between the two factoring methods for both sexes, although the factor correlations differed slightly as a function of factoring method. After the oblique rotation using the principal axis factoring method, the factor correlations were .16 and .14 for males and females, respectively. For the Joreskog factoring method, the factor correlations were somewhat smaller, .10 and .07 for males and females, respectively.

#### The new Achievement Strivings and Impatience/Irritability scales

Of the items reaching the .35 loading criterion on the Achievement Strivings (AS) factor, 7 of the best items that collectively produced a satisfactory alpha were selected for the AS scale. As listed in Table 1, these are the items numbered 2, 17, 19, 20, 31, 40, and 44. All five of the items that reached the loading criterion on the second factor were assigned to the Impatience/Irritability (I/I) scale (items 9, 14, 22, 23, and 27 in Table 1). The Cronbach alphas for the AS scale were .70 and .72 for males and females, respectively (see Table 3). The corresponding alphas for the I/I scale were .66 and .65. These are

quite satisfactory, considering the small number of items per scale.

The correlations between the new AS and I/I scales and the three original Jenkins scales appear in table 2. As will be observed the original factor H and S scales are substantially correlated (.57 for both males and females). Although the two new scales are still significantly correlated with one another, .17 for males and .18 for females ( $p < .01$ ), they are considerably less so than the JAS H and S scales. It will also be observed that in both sexes the AS scale was substantially related to both the JAS H and S scales whereas the correlations of the I/I with these scales were lower. Inspection of item content suggests that this came about because of the substantial number of achievement-related items on both the H and S scales.

Normative data. Percentile scores and other descriptive statistics on the new AS and I/I scales are shown in Table 3. The skewness coefficients for males were slightly higher than for females, but both were small and indicate that the distributions were essentially symmetrical. Females scored higher than males on both scales, but only the difference in means on the I/I scale reached significance ( $F = 7.184$ ,  $df = 1, 1,033$ ,  $p < .01$ ).

## STUDY 2

It will be recalled that the original JAS items had varying number of alternatives and that the student version left the alternatives for each item essentially unchanged. However, there is no conceptual rationale for this variability and the lack of uniformity has psychometric disadvantages. Revised versions of the AS and I/I scales were therefore prepared in which a 5-point rating scale accompanied each item. Described below are data obtained from a sample of students of both sexes given the revised scales.

### Subjects and Procedures

The subjects were 256 male and 225 female students enrolled in introductory psychology courses during the Spring semester of 1986 who participated as part of a course requirement. The subjects were tested in university classrooms in mixed sex groups ranging in size between 80 and 100 persons.

### Measures

Subjects were given a revised version of the JAS Form 1, consisting only of the twelve items that comprise the new AS and I/I scales. The major revision involved an expansion of the rating scales accompanying each item to a 5-point Likert-type scale, with modification of wording where necessary to

Table 2

Correlations between the Three Jenkins Scales and the New AS and I/I Scales  
for Male (n=483) and Female (n=552) College Students in Study I

Note: Upper diagonal shows  $r$ 's for males and the lower diagonal shows  $r$ 's for females.

	<u>A-B</u>	<u>H</u>	<u>S</u>	<u>AS</u>	<u>I/I</u>
<u>A-B</u>	--	.72	.79	.74	.43
<u>H</u>	.69	--	.57	.82	.34
<u>S</u>	.78	.57	--	.55	.71
<u>AS</u>	.72	.82	.54	--	.17
<u>I/I</u>	.42	.36	.68	.18	--

Key: A-B - global A-B score; H - Factor H (Hard-Driving Competitiveness);  
S - Factor S (Speed and Impatience); AS - Achievement Striving; I/I -  
Impatience/Irritability.

Note:  $\alpha_{.05} = .09$  (1-tailed),  $\alpha_{.01} = .12$  (1-tailed).

Table 3

Percentile Scores and Other Descriptive Statistics for the New AS and I/I  
Scales (Unrevised Format) in Male (n=483) and Female (n=552)  
College Students from Study 1

Note: The possible ranges are 10 to 35 for the AS scale, and 7 to 25 for the I/I scale.

%tile	<u>Achievement Striving</u>		<u>Impatience/Irritability</u>	
	Males	Females	Males	Females
0	10	12	8	8
10	19	19	11	12
20	20	21	12	13
30	22	22	13	14
40	23	23	14	15
50	24	24	15	16
60	25	25	16	16
70	26	26	17	17
80	28	28	18	18
90	29	30	19	20
100	34	35	24	24
Mean	23.96	24.44	15.12	15.63
Median	24.16	24.16	14.91	15.85
SD	4.12	4.03	3.03	3.04
Range	10-34	12-35	8-24	8-24
Skew	-.18	-.03	.14	.02
Alpha	.70	.72	.66	.65

accommodate the new response scales. A copy of the new Achievement Strivings scale (7-items) and Impatience/Irritability scale (5-items) along with scoring keys appear in Appendix A. A unit-weighted scoring system was used, with responses indicating a high degree of Achievement Striving or Impatience/Irritability being given a score of 5.

## Results

### Confirmatory Factor Analyses

The data were subjected to confirmatory factor analyses, separately for each sex. The purpose of these analyses was to determine whether the factor pattern matrices obtained from males and females in the first study could be replicated. The confirmatory factor analyses were conducted using a principal axis solution with iteration and an oblique rotation using an oblimin solution (Nie et al., 1975). Based upon an eigenvalue-one criterion, a two factor solution was subjected to the oblique rotation method described above.

The rotated factor pattern loadings obtained for each of the 12 items are listed in Table 4 for males and for females separately. All items loaded above a .35 criterion, except for item 19 for females, which had a loading of .34. There was again a substantial degree of concordance between the pattern loadings for the two sexes. The results of the confirmatory factor analyses unequivocally replicate the two-factor structure obtained in Study 1 and reproduced the assignment of items to the AS and I/I scales.

The AS factor accounted for 72% of the variance with an eigenvalue of 3.10 for males and accounted for 64.5% of the variance with an eigenvalue of 2.67 for females. The I/I factor accounted for 28% of the variance with an eigenvalue of 1.02 for males, and accounted for 35.5% of the variance with an eigenvalue of 1.48 for females. After the oblique rotation using the principal axis factoring method, the factor correlations were .34 and .17 for males and females, respectively. An inspection of the factor pattern matrices in Table 4 reveals a cleaner loading pattern between the two factors, relative to the matrices reported in Table 1. Virtually all of the items on the AS factor load more cleanly on the first factor, and 3 of the 5 I/I items show improved loading patterns. This might be attributable to the uniform use of a 5-point response format and improved item wordings.

Internal Consistency and Scale Correlations. The Cronbach alphas for the AS scale, shown in Table 5, were enhanced relative to those reported in Study 1. For males, the Cronbach alpha for the AS scale increased from .70 in Study 1 to .79 in Study II, and for females, it increased from .72 to .79. The alphas for the I/I scales were .67 and

Table 4

Rotated Factor Pattern Matrices from Confirmatory Factor Analyses of  
New AS and I/I Scale (Revised Format) Items for Male (n=256)  
and Female (n=225) College Students in Study 2

Note: The item numbers shown correspond to those from the JAS-Form T  
shown in Table 1 to allow direct comparison of factor matrices from Study 1.

Item No.	Abridged Item Description	Factor			
		AS		I/I	
		Males	Females	Males	Females
2.	College stirs me into action.	.47	.62	.06	-.04
17.	I consider myself hard-driving.	.58	.66	.21	.21
19.	Friends rate me as too active.	.40	.34	-.01	.07
20.	I take my work too seriously.	.78	.66	-.12	-.05
31.	I set deadlines for myself.	.49	.51	-.01	-.02
40.	I put forth more effort than most	.83	.78	-.10	-.15
44.	I approach life seriously.	.56	.57	.11	.02
9.	I hurry people to come to the point.	-.12	-.06	.53	.42
14.	I refuse to wait in lines.	.06	.01	.44	.41
22.	I tend to get irritated easily.	-.02	-.03	.71	.83
23.	I do most things in a hurry.	-.19	.08	.36	.37
27.	My temper is very hard to control	.08	-.01	.64	.57

Table 5

Percentile Scores and Descriptive Statistics for the New AS and I/I Scales  
with Revised Items and Response Formats in Male (n=256) and  
Female (n=225) College Students in Study 2

Note: The possible ranges are 7 to 35 for the AS scale, and 5 to 25 for the  
I/I scale.

% tile	<u>Achievement Striving</u>		<u>Impatience/Irritability</u>	
	Males	Females	Males	Females
0	7	11	5	8
10	16	18	10	11
20	18	20	11	12
30	20	21	13	13
40	21	22	13	14
50	23	24	14	15
60	24	25	15	16
70	25	26	16	17
80	27	28	18	18
90	29	29	19	19
100	35	33	24	25
Mean	22.60	23.60	14.41	15.10
Median	22.89	23.75	14.50	14.83
SD	4.85	4.63	3.56	3.25
Range	7-35	11-33	5-24	8-25
Skew	-.14	-.22	.05	.35
Alpha	.79	.79	.67	.63

  

<u>AS - I/I Correlations</u>	
Males: $r = .32$ ( $p < .01$ )	Females: $r = .14$ ( $p < .05$ )

.63 for males and females, respectively, values that are highly similar to those in Study 1. The correlations between the new AS and I/I scales were .32 and .14 for males and females respectively.

Normative Data. Selected percentile scores and descriptive statistics are shown in Table 5. The skewness coefficients for both sexes are small. As in Study 1, females scored higher on both the AS scale ( $E = 5.29$ ,  $p < .05$ ) and the I/I scale ( $E = 4.78$ ,  $p < .05$ ).

### STUDY 3

It will be recalled that as part of an investigation of personality factors related to scholarly attainment a sample of male academic psychologists was given the JAS (Matthews et al., 1980). The results of factor analyses of these data are reported below.

#### Subjects and Measure

The subjects were 118 male members of the Society for Experimental Social Psychology with academic appointments who had been given the JAS-Form B, among other instruments (Matthews et al., 1980). The sample was predominantly middle-aged ( $M = 42.9$  years). Additional characteristics of the sample may be found in Matthews et al. (1980) and Helmreich et al. (1980).

Responses to the JAS were obtained from the Matthews et al. (1980) archival data set. For the present study, the items were rescored using the proportional weighting system described in Study 1 to adjust for the variable number of points in the rating scales accompanying the items.

### Results

#### Confirmatory Factor Analysis on AS and I/I Scale Responses

Several tests were first applied to the data to assess their appropriateness for factor analysis (Dziuban & Shirkey, 1974). The sample was not adequate for a complete factoring of the total set of items but did prove adequate to conduct a confirmatory factor analysis on the 12 items comprising the new AS and I/I scales identified in the student samples of Studies I and II. The Bartlett's test of sphericity was significant ( $p = .001$ ). The Kaiser-Meyer measure of sampling adequacy was also satisfactory at .77.

The responses to the 12-items that comprise the AS and I/I scales were subjected to a confirmatory factor analysis using a principal axis solution with iteration and oblique rotation using an oblimin solution (Nie et al., 1975). As in the previous two analyses, a two factor solution was subjected to the oblique rotation method described above.

the rotated factor pattern loadings obtained for each of the 12 items are listed in Table 6. An inspection of the factor pattern matrix shows two clearly differentiated factors with all items meeting a .35 loading criterion on one of the factors. The factor pattern replicated that from the student samples. The AS factor accounted for 75.3% of the variance and the I/I factor accounted for 24.7% of the variance. After the oblique rotation, the factor correlation was .36 ( $p < .01$ ).

Properties of AS and I/I scales. As shown in Table 7, Cronbach alphas for the AS scale were .78, and .62 for the I/I scale.

The correlations between the three original Jenkins scales and the new AS and I/I scales also appear in Table 7. The pattern of correlations of the AS and I/I scales with the JAS scales can be observed to be similar to those for students, reported in Table 2. Thus the correlation between the AS and I/I scales is .37, whereas the correlation of the original factor H and S scales from this sample is considerably higher (.69). Further, AS is more highly related to these scales than I/I.

#### Comparisons with College Students

Although the versions of the JAS given to the students in Study 1 and to the male psychologists are not identical, they are similar enough to warrant comparisons of the two groups. As was expected, the psychologists scored higher than the male students on AS (means of 27.33 and 23.96, respectively,  $t = 7.95$ ,  $p < .001$ ). They also scored significantly higher than the male students on I/I (means of 15.94 and 15.12,  $t = 2.61$ ,  $p < .01$ ) although the difference is less striking than in the case of AS.

#### DISCUSSION

The results obtained from both males and females in the student sample given the full JAS-T clearly indicate the presence of two relatively independent factors, with the items loading on the two factors having discernibly different content. Items assigned to the Achievement Strivings (AS) scale refer to achievement-oriented behaviors and attitudes (toward academic endeavors in this case) whereas those assigned to the Impatience/Irritability scales describe the tendency to experience those affective reactions. The confirmatory factor analyses performed on data from the parallel AS and I/I item obtained from the second student sample and from the male psychologists verified these two factors.

The question these data raise is whether the empirical relationships that have been reported between the constellation of characteristics identified as type A and

Table 6

Rotated Factor Pattern Matrix from Confirmatory Factor Analysis of  
New AS and I/I Scale Items from the JAS-Form B  
in Male Psychologists (n=118)

Note: The item numbers shown correspond to those from the JAS-Form T to allow direct comparison of factor matrices from Studies 1 and 2.

Item No.	Abridged Item Description	Factor	
		AS	I/I
2.	My job stirs me into action.	.53	-.09
17.	I consider myself hard-driving.	.55	.26
19.	Friends rate me as too active.	.44	.25
20.	I take my work too seriously.	.57	-.06
31.	I set deadlines for myself.	.45	.03
40.	I put forth more effort than most.	.57	.04
44.	I approach life seriously.	.67	-.07
9.	I hurry people to come to the point.	.05	.42
14.	I refuse to wait in lines.	.04	.46
22.	I tend to get irritated easily.	.09	.66
23.	I do most things in a hurry.	.22	.36
27.	My temper is hard to control.	.06	.50

Table 7

Correlations between the JAS and the New AS and I/I Scales and Selected Descriptive Statistics for the Male Psychologists (n=118) of Study 3

	<u>A-B</u>	<u>H</u>	<u>S</u>	<u>AS</u>
<u>H</u>	.80			
<u>S</u>	.79	.69		
<u>AS</u>	.73	.84	.67	
<u>I/I</u>	.53	.46	.74	.37

---

	<u>AS</u>	<u>I/I</u>
<u>Mean</u>	27.33	15.94
<u>SD</u>	4.13	3.14
<u>Alpha</u>	.78	.62

Note:  $\alpha_{.01} = .23$  (1-tailed).

various kinds of criterion variables are attributable to different factors buried within this constellation. A number of investigators, it will be recalled, have suggested that the component of the Type pattern that is responsible for the association of the latter with CHD and other related disorders is related to anger and hostility, affective reactions that are tapped by our I/I scale. The factor analytic results we have obtained suggest an important addition to this hypothesis: not only may the hostile components of the Type A complex be responsible for the association with CHD but those exhibiting these characteristics do not necessarily exhibit other aspects of the Type A complex. For example, those who are irritable and impatient (as reflected by their I/I scores) do not necessarily exhibit strong achievement strivings (such as reflected on our AS scale). Conversely, those who are high in achievement strivings may not be high in hostility and anger and therefore not be at higher risk for CHD. One could also argue that the demonstrated associations between measures of vocational and academic performance and Type A are due to the aspects of the Type A complex involving achievement-related behaviors but not to hostility, anger, and irritability.

The present investigators have conducted studies to assess these several possibilities. In one, Helmreich, Spence and Pred (submitted for publication) reanalyzed the JAS data from the male academic psychologists obtained by Matthews et al. (1980) (and described in Study 3). As was described earlier, the original JAS scales (A-8, H, and S) were found to be positively related to two measures of scholarly attainment, number of publications and number of citations by others to the respondents' published work. Helmreich et al. (submitted for publication) obtained scores on the new AS and I/I scales for each respondent and found that both performance measures were significantly related to AS but were nonsignificantly related to I/I. Similar results were obtained in a study of college students by Spence, Helmreich, and Pred (in press) and in a recently completed dissertation by Chidester (1986) studying jet transport pilots. Thus in the former investigation, the AS scale but not the I/I scale was found to be significantly and positively correlated with grade point average in two student samples (described here in Studies 1 and 2). Chidester (1986) reported that ratings of pilots' performance by trained observers were significantly related in a positive direction with their scores on our AS scale but that their I/I scores were either nonsignificantly related or significantly related in a negative direction with the performance measures.

Subjects in the Spence et al. (in press) study of college students and the Chidester (1986) dissertation study of pilots were also given a health survey inquiring about sleep disturbances, fatigue, and the occurrence of minor

physical illnesses. Congruent with CHD research, respondents higher in their I/I scores reported more symptoms. No significant correlations, however, were found with AS scores.

These data strongly suggest that in future research, it would be advisable to attempt to decompose the constellations of behaviors that have been identified as the Type A pattern and to determine separately the relationships of its constituent components to various criterion measures. Particularly perhaps for investigators who are interested in the personality factors contributing to cardiovascular disorders, our results also provide encouraging evidence that objective, self-report measures can provide valid assessments. Thus such measures need not be abandoned, at least for research purposes, in favor of complicated, time-consuming, interview procedures. The success of the Structured Interview technique in identifying coronary prone individuals may be due to the weight given by interviewers to behaviors indicative of hostility, impatience, and irritability rather than to irrelevant or peripheral aspects of what has been verbally identified as the Type A pattern. Inspection of its item content, supported by our factor analytic results, suggests that the JAS is particularly saturated with items describing achievement-and work-oriented behaviors. The lesser success of the JAS in identifying individuals at risk for cardiovascular disorders may be due not to the fact that it is an objective self-report measure but rather to the paucity of items tapping hostility, irritability and impatience as opposed to other types of items with little or no relationship with CHD and other health problems.

#### References

- Anderson, J.R., & Waldron, I. (1983). Behavioral and content components of the Structured Interview assessment of the Type A pattern in women. *Journal of Behavioral Medicine*, 6, 123-134.
- Barefoot, J.C., Dahlstrom, W.G., & Williams, R. B. (1983). Hostility, CHD incidence, and total mortality: A 25-year follow-up study of 255 physicians. *Psychosomatic Medicine*, 45, 59-64.
- Brand, R.J. (1978). Coronary-prone behavior as an independent risk factor for coronary heart disease. In T.M. Dembroski, S.M. Weiss, J.L. Shields, S.G. Haynes, & M. Feinleib (Eds.) *Coronary-prone behavior*. New York: Springer-Verlag.
- Brand, R.J., Rosenman, R.H., Jenkins, C.D., Sholtz, R.I., & Zyzanski, S.J. (1975). Coronary heart disease in the

- Western Collaborative Group Study. Final follow-up experience of 8 1/2 years. Journal of American Medical Association, 233, 872-877.
- Brand, R.J., Rosenman, R.H., Jenkins, C.D., Sholtz, R.I., & Zyzanski, S.J. (1978). Comparison of coronary heart disease prediction in the Western Collaborative Group study using the Structured Interview and the Jenkins Activity Survey assessment of the coronary-prone Type A behavior pattern. Paper presented at the annual Conference on Cardiovascular Disease Epidemiology, American Heart Association, Orlando, Florida.
- Burns, P. (1977). SPSS Subprogram JFACTOR--Joreskog Factor Analysis (Document No. 412, Rev. A) Evanston, Ill: Northwestern University, Vogelback Computing Center.
- Chidester, T.R. (1986). Mood, sleep and fatigue effects in flight operations. Unpublished doctoral dissertation, The University of Texas at Austin.
- Dziuban, C.D., & Shirkey, E.C. (1974). When is a correlation matrix appropriate for factor analysis? Some decision rules. Psychological Bulletin, 81, 358-361.
- Friedman, H.S., Hall, J.A., & Harris, M.J. (1984). Nonverbal expression of emotion: Healthy charisma or coronary-prone behavior? In C. Van Dyke, L. Temoshok, & L.S. Zegans (Eds.) Emotions in health and illness: Applications to clinical practice. New York: Grune & Stratton.
- Friedman, M. & Rosenman, R.H. (1959). Association of specific overt behavior pattern with blood and cardiovascular findings. Journal of the American Medical Association, 169, 1286-1296.
- Friedman, M. & Rosenman, R.H. (1974). Type A behavior and your heart. New York: Knopf.
- Glass, D.C. (1977). Behavior patterns, stress, and coronary disease. Hillsdale, NJ: L. Erlbaum.
- Haynes, S.G., Feinleib, M., & Kannel, W.B. (1980). The relationship of psychosocial factors to coronary heart disease in the Framingham study. Part III: Eight-year incidence of CHD. American Journal of Epidemiology, 3, 37-58.
- Helmreich, R.L., Fred, R.S., & Spence, J.T. (1986). Making it without losing it: Type A, achievement motivation, and scientific attainment revisited. Manuscript submitted for publication.

- Helmreich, R.L., Spence, J.T., Beane, W.E., Lucker, G.W., & Matthews, K.A. (1980). Making it in academic psychology: Demographic and personality correlates of attainment. Journal of Personality and Social Psychology, 39, 896-908.
- Jenkins, C.D., Rosenman, R.H., & Zyzanski, S.J. (1972). The Jenkins activity survey for health prediction, Form B. Boston: Authors.
- Jenkins, C.D., Rosenman, R.H., & Zyzanski, S.J. (1974). Prediction of clinical coronary heart disease by a test for the coronary-prone behavior pattern. The New England Journal of Medicine, 290, 1271-1275.
- Jenkins, C.D., Zyzanski, S.J., & Rosenman, R.H. (1971). Progress toward validation of a computer-scored test for the Type A coronary-prone behavior pattern. Journal of the American Psychosomatic Society, 33, 193-202.
- Jenkins, C.D., Zyzanski, S.J., & Rosenman, R.H. (1976). Risk of new myocardial infarction in middle-aged men with manifest coronary heart disease. Circulation, 53, 342-347.
- Jenkins, C.D., Zyzanski, S.J., Rosenman, R.H., & Cleveland, G.L. (1971). Association of coronary prone behavior scores with recurrence of coronary heart disease. Journal of Chronic Diseases, 24, 601-611.
- Kenigsberg, D., Zyzanski, S.J., Jenkins, C.D., Wardwell, W.I., & Licciardello, A.T. (1974). The coronary-prone behavior pattern in hospitalized patients with and without coronary heart disease. Psychomatic Medicine, 36, 344-351.
- Krantz, D.S., Glass, D.C., & Snyder, M.L. (1974). Helplessness, stress level, and the coronary-prone behavior pattern. Journal of Experimental Social Psychology, 10, 284-300.
- Matthews, K.A. (1982). Psychological perspectives on the Type A behavior pattern. Psychological Bulletin, 91, 293-323.
- Matthews, K.A., Glass, D.C., Rosenman, R.H., & Bortner, R.W. (1977). Competitive drive, pattern A, and coronary heart disease: A further analysis of some data from the Western Collaborative Group Study. Journal of Chronic Diseases, 30, 489-498.
- Matthews, K.A., & Haynes, S.G. (1986). Type A behavior pattern and coronary disease risk. Journal of Epidemiology, 123, 923-960.

- Matthews, K.A., Helmreich, R.L., Beane, W.E., & Lucker, G.W. (1980). Pattern A, achievement striving, and scientific merit: Does pattern A help or hinder? Journal of Personality and Social Psychology, 42, 303-313.
- Matthews, K.A., Krantz, D.S., Dembroski, T.M., & MacDougall, J.M. (1982). Unique and common variance in Structured Interview and Jenkins Activity Survey measures of the type A behavior pattern. Journal of Personality and Social Psychology, 42, 303-313.
- Medalie, J.H., & Goldbourt, U. (1976). Angina pectoris among 10,000 men. American Journal of Medicine, 60, 910-921.
- Nie, N.H., Hull, C.H., Jenkins, J.G., Steinbrenner, K., & Bent, D.H. (1975). SPSS: Statistical package for the social sciences. (2nd ed.) New York: McGraw-Hill.
- Rosenman, R.H. (1978). The interview method of assessment of the coronary-prone behavior pattern. In T. Dembroski, S.M. Weiss, J. Shields, S. Haynes, & M. Feinleib (Eds.), Coronary-prone behavior: New York: Springer-Verlag.
- Rosenman, R.H., Brand, R.J., Jenkins, C.D., Friedman, M., Straus, R., & Wurm, M. (1975). Coronary heart disease in the Western Collaborative Group Study: Final follow-up experience of 8 1/2 years. Journal of the American Medical Association, 233, 872-877.
- Rosenman, R.H., Friedman, M., Straus, R., Wurm, M., Kositchek, R., Hahn, W., & Werthessen, N.T. (1964). A predictive study of coronary heart disease. Journal of the American Medical Association, 189, 103-110.
- Rummel, R.J. (1970). Applied factor analysis. Evanston: Northwestern University Press.
- Shekelle, R.B., Schoenberger, J.A., & Stamler, J. (1976). Correlates of the JAS type A behavior pattern score. Journal of Chronic Diseases, 29, 381-394.
- Spence, J.T., & Helmreich, R.L. (1983). Achievement-related motives and behavior. In J.T. Spence (Ed.), Achievement and achievement motives: Psychological and sociological approaches (pp. 10-74). San Francisco: W.H. Freeman & Co.
- Spence, J.T., Helmreich, R.L., Fred, R.S. (in press). Impatience versus achievement strivings in the type A pattern: Differential effects on students' health and academic achievement. Journal of Applied Psychology.
- Taylor, M.S., Locke, E.A., Lee, C., & Gist, M. (1984). Type A behavior and faculty research productivity: What are the mechanisms? Organizational Behavior and Human Performance, 34, 402-418.

- Waldron, I., Hickey, A., McPherson, C., Butensky, A., Gruss, L., Overall, K., Schmader, A., & Wohlmuth, D. (1980). Type A behavior pattern: Relationship to variation in blood pressure, parental characteristics, and academic and social activities of students. Journal of Human Stress, 6, 16-27.
- Williams, Jr., R.B., Haney, T.L., Lee, K.I., Kong, Y., Blumenthal, J.A., & Whalen, R.E. (1980). Type A behavior, hostility, and coronary atherosclerosis. Psychosomatic Medicine, 42, 539-549.
- Zyzanski, S.J., & Jenkins, C.D. (1970). Basic dimensions within the coronary-prone behavior pattern. Journal of Chronic Diseases, 22, 781-795.
- Zyzanski, S.J., Jenkins, C.D., Ryan, T.J., Flessas, A., & Everist, M. (1976). Psychological correlates of coronary angiographic findings. Archives of Internal Medicine, 136, 1234-1237.

## Appendix A

### Jenkins Activity Survey with Revised Items, Response Formats, and Scoring Key: the New Achievement Striving and Impatience/Irritability Scales

For each question below, please select the alternative that best describes yourself or your opinion. Indicate the alternative you choose by circling the appropriate letter on the scale, A, B, C, D, or E.

#### Scale<sup>1</sup>

- AS    1.    How much does college<sup>2</sup> "stir you into action"?
- A.....B.....C.....D.....E
- Much less                      About                      Much more often  
than others                      average                      than others
- I/I    2.    When a person is talking and takes too long to come to the point, how often do you feel like hurrying the person along?
- A.....B.....C.....D.....E
- Very frequently                      Occasionally                      Almost never
- AS    3.    Nowadays, do you consider yourself to be:
- A.....B.....C.....D.....E
- Very hard-                      Slightly                      Very relaxed  
driving                      hard-driving                      and easy going
- AS    4.    How would your best friend or others who know you well rate your general level of activity?
- A.....B.....C.....D.....E
- Too slow.                      About                      Very active.  
Should be more active                      average                      Should slow down
- I/I    5.    Typically, how easily do you get irritated?
- A.....B.....C.....D.....E
- Extremely                      Somewhat                      Not at all  
easily                      easily                      easily

<sup>1</sup>The scale to which the items are assigned is shown at the left. AS - Achievement Striving; I/I - Impatience/Irritability. The underlined alternative indicates the Type A response and is coded as 5.

<sup>2</sup>Adult version: How much does your job

# Appendix A (continued)

- AS 6. How seriously do you take your work?  
 A.....B.....C.....D.....E  
 Much less About Much more  
 seriously Average seriously  
 than most than most
- AS 7. How often do you set deadlines or quotas for yourself in courses<sup>3</sup>  
 or other activities?  
 A.....B.....C.....D.....E  
Very often Sometimes Almost never
- I/I 8. Do you tend to do most things in a hurry?  
 A.....B.....C.....D.....E  
 Not at all More true Definitely  
 true than not true
- AS 9. Compared with other students<sup>4</sup>, the amount of effort I put forth is:  
 A.....B.....C.....D.....E  
Much more About average Much less
- I/I 10. How is your "temper" these days?  
 A.....B.....C.....D.....E  
Very hard Sometimes get I seldom get  
to control angry but easy angry  
 to control
- AS 11. Compared with other students<sup>5</sup>, I approach life in general:  
 A.....B.....C.....D.....E  
Much more About Much less  
seriously average seriously
- I/I 12. When you have to wait in line such as at a restaurant, the movies,  
 or the post office, how do you usually feel?  
 A.....B.....C.....D.....E  
 Accept it Feel very impatient  
 calmly and refuse to stay long

<sup>3</sup>Adult version: How often do you set deadlines or quotas for yourself at work

<sup>4</sup>Adult version: Compared with others in my occupation

<sup>5</sup>Adult version: Compared with others in my occupation